CLAIMS:

1. A method, comprising: zooming into or out of an image having at least one object, wherein at least some elements of the at least one object are scaled up and/or down in a way that is non-physically proportional to one or more zoom levels associated with the zooming.

2. The method of claim 1, wherein the non-physically proportional scaling may be expressed by the following formula: $\mathbf{p} = \mathbf{d'} \cdot \mathbf{z}^{\mathbf{a}}$, where $\mathbf{p}$ is a linear size in pixels of one or more elements of the object at the zoom level, $\mathbf{d'}$ is an imputed linear size of the one or more elements of the object in physical units, $\mathbf{z}$ is the zoom level in units of physical linear size/pixel, and $\mathbf{a}$ is a power law where $\mathbf{a} \neq -1$.

3. The method of claim 2, wherein at least one of $\mathbf{d'}$ and $\mathbf{a}$ may vary for one or more elements of the object.

4. The method of claim 2, wherein the power law is $-1 < \mathbf{a} < 0$ within a range of zoom levels $\mathbf{z0}$ and $\mathbf{z1}$, where $\mathbf{z0}$ is of a lower physical linear size/pixel than $\mathbf{z1}$.

5. The method of claim 4, wherein at least one of $\mathbf{z0}$, $\mathbf{z1}$, $\mathbf{d'}$ and $\mathbf{a}$ may vary for one or more elements of the object.

6. The method of claim 1, wherein at least some elements of the at least one object are also scaled up and/or down in a way that is physically proportional to one or more zoom levels associated with the zooming.

7. The method of claim 6, wherein the physically proportional scaling may be expressed by the following formula: $\mathbf{p} = \mathbf{c} \cdot \mathbf{d}/\mathbf{z}$, where **p** is a linear size in pixels of one or more elements of the object, **c** is a constant, **d** is a real or imputed linear size in physical units of the one or more elements of the object, and **z** is the zoom level in physical linear size/pixel.

8. The method of claim 6, wherein:

the elements of the object are of varying degrees of coarseness; and

the scaling of the elements at a given zoom level are physically proportional or non-physically proportional based on at least one of: (i) a degree of coarseness of such elements; and (ii) the zoom level.

9. The method of claim 8, wherein:

the object is a roadmap, the elements of the object are roads, and the varying degrees of coarseness are road hierarchies; and

the scaling of a given road at a given zoom level is physically proportional or non-physically proportional based on: (i) the road hierarchy of the given road; and (ii) the zoom level.

10. A storage medium containing one or more software programs that are operable to cause a processing unit to execute actions, comprising: zooming into or out of an image having at least one object, wherein at least some elements of the at least one object are scaled up and/or down in a way that is non-physically proportional to one or more zoom levels associated with the zooming.

11. The storage medium of claim 10, wherein the non-physically proportional scaling may be expressed by the

following formula: $\mathbf{p} = \mathbf{d'} \cdot \mathbf{z}^{\mathbf{a}}$, where $\mathbf{p}$ is a linear size in pixels of one or more elements of the object at the zoom level, $\mathbf{d'}$ is an imputed linear size of the one or more elements of the object in physical units, $\mathbf{z}$ is the zoom level in units of physical linear size/pixel, and $\mathbf{a}$ is a power law where $\mathbf{a} \neq -1$.

12. The method of claim 11, wherein at least one of $\mathbf{d'}$ and $\mathbf{a}$ may vary for one or more elements of the object.

13. The storage medium of claim 11, wherein the scale power is $-1 < \mathbf{a} < 0$ within a range of zoom levels between $\mathbf{z0}$ and $\mathbf{z1}$, where $\mathbf{z0}$ is of a lower physical linear size/pixel than $\mathbf{z1}$.

14. The storage medium of claim 13, wherein at least one of $\mathbf{z0}$ and $\mathbf{z1}$ may vary for one or more elements of the object.

15. The storage medium of claim 9, wherein at least some elements of the at least one object are also scaled up and/or down in a way that is physically proportional to one or more zoom levels associated with the zooming.

16. The storage medium of claim 15, wherein the physically proportional scaling may be expressed by the following formula: $\mathbf{p} = \mathbf{c} \cdot \mathbf{d}/\mathbf{z}$, where $\mathbf{p}$ is a linear size in pixels of one or more elements of the object, $\mathbf{c}$ is a constant, $\mathbf{d}$ is a real or imputed linear size in physical units of the one or more elements of the object, and $\mathbf{z}$ is the zoom level in physical linear size/pixel.

17. The storage medium of claim 15, wherein:

the elements of the object are of varying degrees of coarseness; and

the scaling of the elements at a given zoom level are physically proportional or non-physically proportional based on at least one of: (i) a degree of coarseness of such elements; and (ii) the zoom level.

18. The storage medium of claim 17, wherein:

the object is a roadmap, the elements of the object are roads, and the varying degrees of coarseness are road hierarchies; and

the scaling of a given road at a given zoom level is physically proportional or non-physically proportional based on: (i) the road hierarchy of the given road; and (ii) the zoom level.

19. An apparatus including a processing unit operating under the control of one or more software programs that are operable to cause the processing unit to execute actions, comprising: zooming into or out of an image having at least one object, wherein at least some elements of the at least one object are scaled up and/or down in a way that is non-physically proportional to one or more zoom levels associated with the zooming.

20. The apparatus of claim 19, wherein the non-physically proportional scaling may be expressed by the following formula: $\mathbf{p} = \mathbf{d'} \cdot \mathbf{z}^{\mathbf{a}}$, where $\mathbf{p}$ is a linear size in pixels of one or more elements of the object at the zoom level, $\mathbf{d'}$ is an imputed linear size of the one or more elements of the object in physical units, $\mathbf{z}$ is the zoom level in units of physical linear size/pixel, and $\mathbf{a}$ is a power law where $\mathbf{a} \neq -1$.

21. The method of claim 20, wherein at least one of $\mathbf{d'}$ and $\mathbf{a}$ may vary for one or more elements of the object.

22. The apparatus of claim 20, wherein the power law is $-1 < \mathbf{a} < 0$ within a range of zoom levels **z0** and **z1**, where **z0** is of a lower physical linear size/pixel than **z1**.

23. The apparatus of claim 22, wherein at least one of **z0** and **z1** may vary for one or more elements of the object.

24. The apparatus of claim 19, wherein at least some elements of the at least one object are also scaled up and/or down in a way that is physically proportional to one or more zoom levels associated with the zooming.

25. The apparatus of claim 24, wherein the physically proportional scaling may be expressed by the following formula: $\mathbf{p} = \mathbf{c} \cdot \mathbf{d}/\mathbf{z}$, where **p** is a linear size in pixels of one or more elements of the object, **c** is a constant, **d** is a real or imputed linear size in physical units of the one or more elements of the object, and **z** is the zoom level in physical linear size/pixel.

26. The apparatus of claim 24, wherein:

the elements of the object are of varying degrees of coarseness; and

the scaling of the elements at a given zoom level are physically proportional or non-physically proportional based on at least one of: (i) a degree of coarseness of such elements; and (ii) the zoom level.

27. The apparatus of claim 26, wherein:

the object is a roadmap, the elements of the object are roads, and the varying degrees of coarseness are road hierarchies; and

the scaling of a given road at a given zoom level is physically proportional or non-physically proportional based on: (i) the road hierarchy of the given road; and (ii) the zoom level.

28. A method, comprising: preparing a plurality of images of different zoom levels of at least one object, wherein at least some elements of the at least one object are scaled up and/or down in a way that is non-physically proportional to one or more zoom levels.

29. The method of claim 28, wherein the images are pre-rendered at a source terminal for delivery to a client terminal.

30. The method of claim 28, wherein the non-physically proportional scaling may be expressed by the following formula: $\mathbf{p} = \mathbf{d'} \cdot \mathbf{z}^{\mathbf{a}}$, where $\mathbf{p}$ is a linear size in pixels of one or more elements of the object at the zoom level, $\mathbf{d'}$ is an imputed linear size of the one or more elements of the object in physical units, $\mathbf{z}$ is the zoom level in units of physical linear size/pixel, and $\mathbf{a}$ is a power law where $\mathbf{a} \neq -1$.

31. The method of claim 30, wherein at least one of $\mathbf{d'}$ and $\mathbf{a}$ may vary for one or more elements of the object.

32. The method of claim 30, wherein the power law is $-1 < \mathbf{a} < 0$ within a range of zoom levels between **z0** and **z1**, where **z0** is of a lower physical linear size/pixel than **z1**.

33. The method of claim 32, wherein at least one of **z0** and **z1** may vary for one or more elements of the object.

34. The method of claim 28, wherein at least some elements of the at least one object are also scaled up and/or down in a way that is physically proportional to one or more zoom levels associated with the zooming.

35. The method of claim 34, wherein the physically proportional scaling may be expressed by the following formula: $\mathbf{p} = \mathbf{c} \cdot \mathbf{d}/\mathbf{z}$, where $\mathbf{p}$ is a linear size in pixels of one or more elements of the object, $\mathbf{c}$ is a constant, $\mathbf{d}$ is a real or imputed linear size in physical units of the one or more elements of the object, and $\mathbf{z}$ is the zoom level in physical linear size/pixel.

36. The method of claim 34, wherein:

the elements of the object are of varying degrees of coarseness; and

the scaling of the elements at a given zoom level are physically proportional or non-physically proportional based on at least one of: (i) a degree of coarseness of such elements; and (ii) the zoom level.

37. The method of claim 36, wherein:

the object is a roadmap, the elements of the object are roads, and the varying degrees of coarseness are road hierarchies; and

the scaling of a given road at a given zoom level is physically proportional or non-physically proportional based on: (i) the road hierarchy of the given road; and (ii) the zoom level.

38. The method of claim 37, wherein the power law is $-1 < \mathbf{a} < 0$ within a range of zoom levels between $\mathbf{z0}$ and $\mathbf{z1}$, where $\mathbf{z0}$ is of a lower physical linear size/pixel than $\mathbf{z1}$.

39. The method of claim 38, wherein at least one of z0 and z1 may vary for one or more of the roads of the roadmap.

40. A method, comprising:

receiving at a client terminal a plurality of pre-rendered images of varying zoom levels of a roadmap;

receiving one or more user navigation commands including zooming information at the client terminal; and

blending two or more of the pre-rendered images to obtain an intermediate image of an intermediate zoom level that corresponds with the zooming information of the navigation commands such that a display of the intermediate image on the client terminal provides the appearance of smooth navigation.

41. The method of claim 40, wherein at least some roads of the roadmap are scaled up and/or down in order to produce the plurality of pre-determined images, and the scaling is at least one of: (i) physically proportional to the zoom level; and (ii) non-physically proportional to the zoom level.

42. The method of claim 41, wherein the physically proportional scaling may be expressed by the following formula: $\mathbf{p} = \mathbf{c} \cdot \mathbf{d}/\mathbf{z}$, where $\mathbf{p}$ is a linear size in pixels of one or more elements of the object at the zoom level, $\mathbf{c}$ is a constant, $\mathbf{d}$ is a real or imputed linear size of the one or more elements of the object in physical units, and $\mathbf{z}$ is the zoom level in units of physical linear size/pixel.

43. The method of claim 41, wherein the non-physically proportional scaling may be expressed by the following formula: $\mathbf{p} = \mathbf{d'} \cdot \mathbf{z}^{\mathbf{a}}$, where $\mathbf{p}$ is a linear size in pixels of one or more elements of the object at the zoom level, $\mathbf{d'}$ is an imputed linear

size of the one or more elements of the object in physical units, **z** is the zoom level in units of physical linear size/pixel, and **a** is a power law where **a** $\neq -1$.

44. The method of claim 43, wherein at least one of **d'** and **a** may vary for one or more elements of the object.

45. The method of claim 43, wherein the power law is $-1 <$ **a** $<$ 0 within a range of zoom levels between **z0** and **z1**, where **z0** is of a lower physical linear size/pixel than **z1**.

46. The method of claim 45, wherein at least one of z0 and z1 may vary for one or more roads of the roadmap.

47. The method of claim 40, wherein:

the roads of the roadmap are of varying degrees of coarseness; and

the scaling of the roads in a given pre-rendered image are physically proportional or non-physically proportional based on at least one of: (i) a degree of coarseness of such roads; and (ii) the zoom level of the given pre-rendered image.

48. A method, comprising:

receiving at a client terminal a plurality of pre-rendered images of varying zoom levels of at least one object, at least some elements of the at least one object being scaled up and/or down in order to produce the plurality of pre-determined images, and the scaling being at least one of: (i) physically proportional to the zoom level; and (ii) non-physically proportional to the zoom level;

receiving one or more user navigation commands including zooming information at the client terminal;

blending two or more of the pre-rendered images to obtain an intermediate image of an intermediate zoom level that corresponds with the zooming information of the navigation commands; and

displaying the intermediate image on the client terminal.

49. The method of claim 48, wherein the blending step includes performing at least one of alpha-blending, trilinear interpolation, and bicubic-linear interpolation.

50. The method of claim 48, wherein the number of pre-rendered images are such that blending therebetween provides the appearance of smooth navigation.

51. The method of claim 48, wherein the zoom levels and the scaling of the pre-rendered images are selected such that respective linear sizes in pixels **p** of a given one or more of the elements of the object do not vary by more than a predetermined number of pixels as between one pre-rendered image and another pre-rendered image of higher resolution.

52. The method of claim 51, wherein the predetermined number of pixels is about two.

53. The method of claim 50, further comprising downsampling a lowest resolution one of the pre-rendered images to facilitate navigation to zoom levels beyond a zoom level of the lowest resolution one of the pre-rendered images.

54. The method of claim 48, wherein the physically proportional scaling may be expressed by the following formula: $\mathbf{p} = \mathbf{c} \cdot \mathbf{d}/\mathbf{z}$, where **p** is a linear size in pixels of one or more elements of the object at the zoom level, **c** is a constant, **d** is a

real or imputed linear size of the one or more elements of the object in physical units, and **z** is the zoom level in units of physical linear size/pixel.

55. The method of claim 48, wherein the non-physically proportional scaling may be expressed by the following formula: $\mathbf{p} = \mathbf{d'} \cdot \mathbf{z}^{\mathbf{a}}$, where **p** is a linear size in pixels of one or more elements of the object at the zoom level, **d'** is an imputed linear size of the one or more elements of the object in physical units, **z** is the zoom level in units of physical linear size/pixel, and **a** is a power law where $\mathbf{a} \neq -1$.

56. The method of claim 55, wherein at least one of **d'** and **a** may vary for one or more elements of the object.

57. The method of claim 55, wherein the power law is $-1 < \mathbf{a} < 0$ within a range of zoom levels between **z0** and **z1**, where **z0** is of a lower physical linear size/pixel than **z1**.

58. The method of claim 57, wherein at least one of **z0** and **z1** may vary for one or more elements of the object.

59. The method of claim 48, wherein the plurality of pre-rendered images are received by the client terminal over a packetized network.

60. The method of claim 59, wherein the packetized network is the Internet.

61. The method of claim 48, wherein:

the elements of the object are of varying degrees of coarseness; and

the scaling of the elements in a given pre-rendered image are physically proportional or non-physically proportional based on at least one of: (i) a degree of coarseness of such elements; and (ii) the zoom level of the given pre-rendered image.

62. The method of claim 61, wherein:

the object is a roadmap, the elements of the object are roads, and the varying degrees of coarseness are road hierarchies; and

the scaling of a given road in a given pre-rendered image is physically proportional or non-physically proportional based on: (i) the road hierarchy of the given road; and (ii) the zoom level of the given pre-rendered image.

63. The method of claim 62, wherein the non-physically proportional scaling may be expressed by the following formula: $\mathbf{p} = \mathbf{d'} \cdot \mathbf{z}^{\mathbf{a}}$, where **p** is a linear size in pixels of one or more elements of the object at the zoom level, **d'** is an imputed linear size of the one or more elements of the object in physical units, and **z** is the zoom level in units of physical linear size/pixel.

64. The method of claim 63, wherein at least one of **d'** and **a** may vary for one or more elements of the object.

65. The method of claim 63, wherein the power law is $-1 < \mathbf{a} < 0$ within a range of zoom levels between **z0** and **z1**, where **z0** is of a lower physical linear size/pixel than **z1**.

66. The method of claim 65, wherein at least one of **z0** and **z1** may vary for one or more of the roads of the roadmap.

67. A method, comprising:

transmitting a plurality of images of varying zoom levels of at least one object to a terminal over a communications channel, at least some elements of the at least one object being scaled up and/or down in order to produce the plurality of images, and the scaling being at least one of: (i) physically proportional to the zoom level; and (ii) non-physically proportional to the zoom level;

receiving the plurality of images at the terminal;

issuing one or more user navigation commands including zooming information using the terminal;

blending at least two of the images to obtain an intermediate image of an intermediate zoom level that corresponds with the zooming information of the navigation commands; and

displaying the intermediate image on the terminal.

68. The method of claim 67, wherein the blending step includes performing at least one of alpha-blending, trilinear interpolation, and bicubic-linear interpolation.

69. The method of claim 67, wherein the number of images is such that blending therebetween provides the appearance of smooth navigation.

70. The method of claim 67, wherein the zoom levels and the scaling of the pre-rendered images are selected such that respective linear sizes in pixels **p** of a given one or more of the elements of the object do not vary by more than a predetermined number of pixels between one pre-rendered image and another pre-rendered image of higher resolution.

71. The method of claim 70, wherein the predetermined number of pixels is about two.

72. The method of claim 69, further comprising downsampling a lowest resolution one of the images to facilitate navigation to zoom levels beyond a zoom level of the lowest resolution one of the images.

73. The method of claim 69, wherein the physically proportional scaling may be expressed by the following formula: $\mathbf{p} = \mathbf{c} \cdot \mathbf{d}/\mathbf{z}$, where **p** is a linear size in pixels of one or more elements of the object at the zoom level, **c** is a constant, **d** is a real or imputed linear size of the one or more elements of the object in physical units, and **z** is the zoom level in units of physical linear size/pixel.

74. The method of claim 69, wherein the non-physically proportional scaling may be expressed by the following formula: $\mathbf{p} = \mathbf{d'} \cdot \mathbf{z}^{\mathbf{a}}$, where **p** is a linear size in pixels of one or more elements of the object at the zoom level, **d′** is an imputed linear size of the one or more elements of the object in physical units, **z** is the zoom level in units of physical linear size/pixel, and **a** is a power law where $\mathbf{a} \neq -1$.

75. The method of claim 74, wherein at least one of **d′** and **a** may vary for one or more elements of the object.

76. The method of claim 74, wherein the power law is $-1 < \mathbf{a} < 0$ within a range of zoom levels **z0** and **z1**, where **z0** is of a lower physical linear size/pixel than **z1**.

77. The method of claim 76, wherein at least one of **z0** and **z1** may vary for one or more elements of the object.

78. The method of claim 69, wherein the plurality of images are received by the terminal over a packetized network.

79. The method of claim 78, wherein the packetized network is the Internet.

80. The method of claim 69, wherein:

the elements of the object are of varying degrees of coarseness; and

the scaling of the elements in a given image are physically proportional or non-physically proportional based on at least one of: (i) a degree of coarseness of such elements; and (ii) the zoom level of the given pre-rendered image.

81. The method of claim 80, wherein:

the object is a roadmap, the elements of the object are roads, and the varying degrees of coarseness are road hierarchies; and

the scaling of a given road in a given is physically proportional or non-physically proportional based on: (i) the road hierarchy of the given road; and (ii) the zoom level of the given pre-rendered image.

82. The method of claim 81, wherein the non-physically proportional scaling may be expressed by the following formula: $\mathbf{p} = \mathbf{d'} \cdot \mathbf{z}^{\mathbf{a}}$, where **p** is a linear size in pixels of one or more elements of the object at the zoom level, **d'** is an imputed linear size of the one or more elements of the object in physical units, **z** is the zoom level in units of physical linear size/pixel, and **a** is a power law where $\mathbf{a} \neq -1$.

83. The method of claim 82, wherein at least one of **d'** and **a** may vary for one or more elements of the object.

84. The method of claim 82, wherein the scale power is $-1 < \mathbf{a} < 0$ within a range of zoom levels between **z0** and **z1**, where **z0** is of a lower physical linear size/pixel than **z1**.

85. The method of claim 84, wherein at least one of z0 and z1 may vary for one or more of the roads of the roadmap.